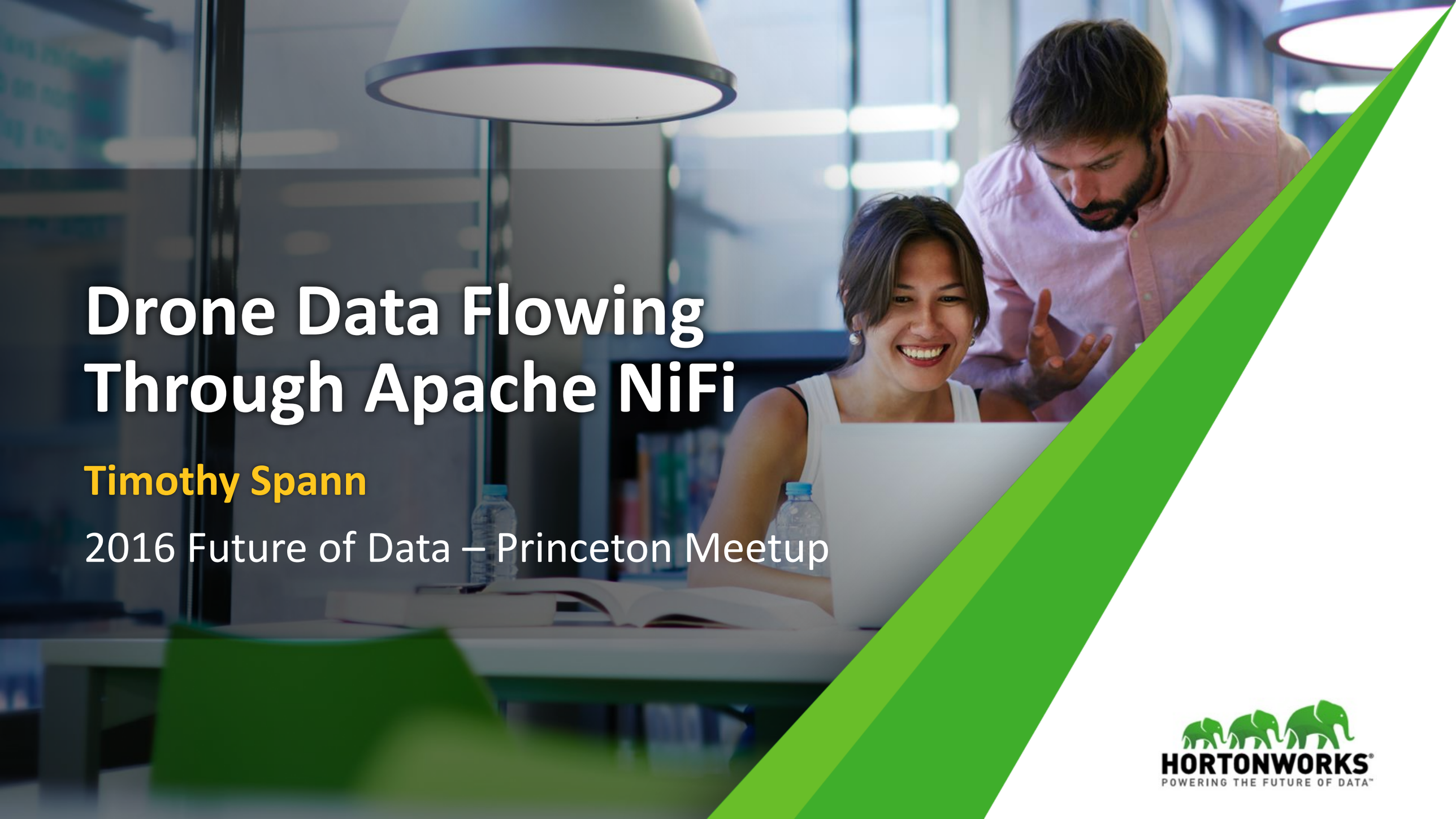
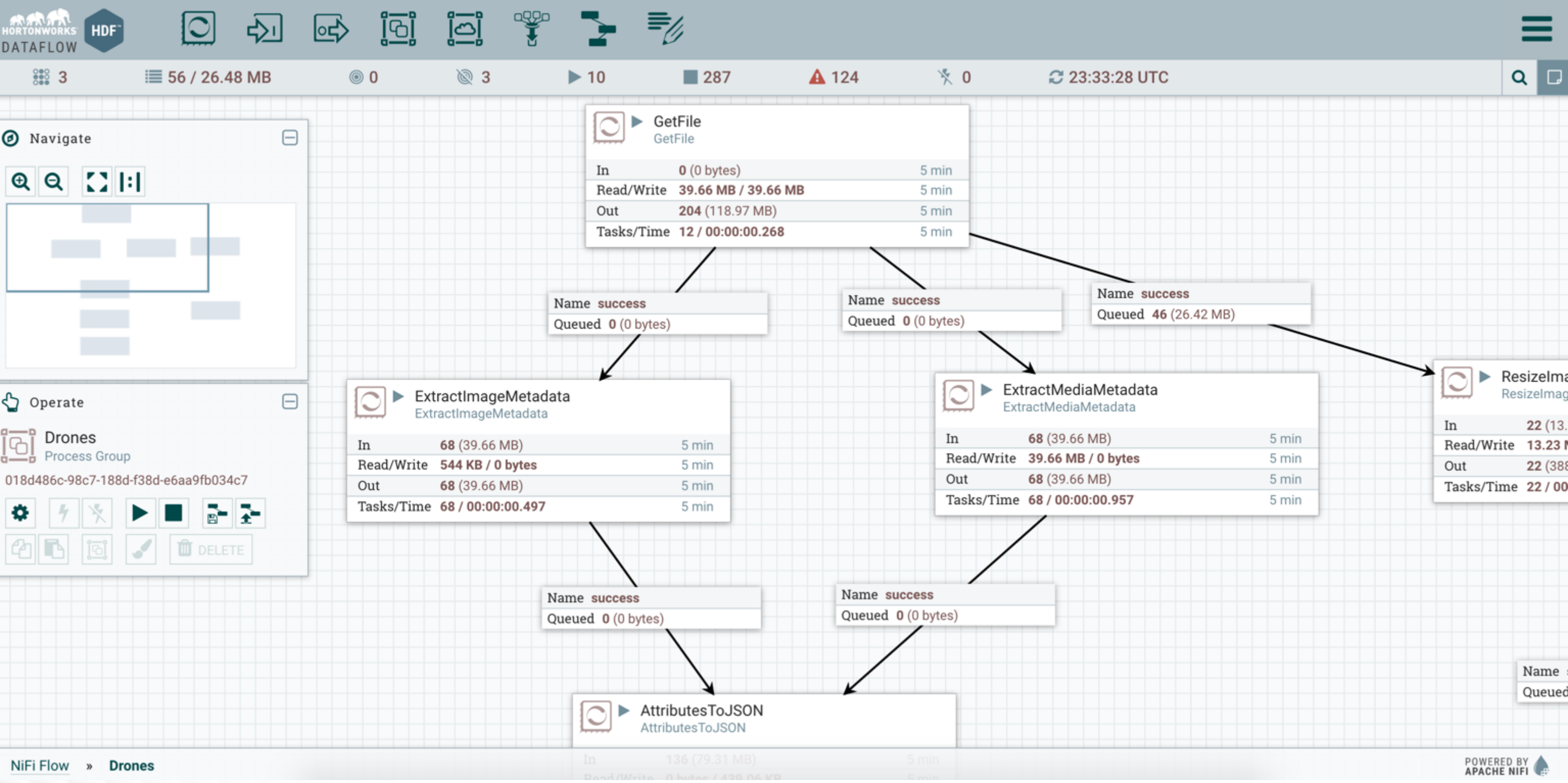


Drone Data Flowing Through Apache NiFi

Timothy Spann

2016 Future of Data – Princeton Meetup

HORTONWORKS®
POWERING THE FUTURE OF DATA™



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Bebop2_2016092008530...

Bebop2_2016092008... 853 KB
Modified: Today, 12:53 PM

Add Tags...

▼ General:

Kind: JPEG image
Size: 853,159 bytes (856 KB on disk)
Where: Macintosh HD ▸ Users ▸ tspann ▸ Downloads ▸ RoofInspection_StillImages
Created: Today, 11:26 AM
Modified: Today, 12:53 PM
☐ Stationery pad
☐ Locked

▼ More Info:

Dimensions: 1920 × 1088
Device make: PARROT
Device model: Bebop 2
Color space: RGB
Focal length: 1.83
Description: { "product_id": "090C", "uuid": "CE112B4276E13339AFBAE10E9ED794E3", "run_date": "2016-09-20T083537-0400", "filename": "Bebop_2_2016-09-20T085308-0400_CE112B.jpg", "media_date": "2016-09-20T085308-0400" }
Alpha channel: No
F number: 2.3
Exposure program: 6

▼ Name & Extension:

Bebop2_20160920085308-0400.jpg

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hdfs dfs -get /drone/meta/Bebop2_20160920085308-0400.json

{"date":"2016-09-20T08:53:08","Compression":"JPEG","Exif Version":"2.10","Components Configuration":"YCbCr","file.group":"root","Compression Type":"Baseline","Image Description":"{ \"product_id\": \"090C\", \"uuid\": \"CE112B4276E13339AFBAE10E9ED794E3\", \"run_date\": \"2016-09-20T083537-0400\", \"filename\": \"Bebop_2_2016-09-20T085308-0400_CE112B.jpg\", \"media_date\": \"2016-09-20T085308-0400\" }","Number of Components":"3","Component 2":"Cb component: Quantization table 1, Sampling factors 1 horiz/1 vert","Focal Length":"1.83 mm","Component 1":"Y component: Quantization table 0, Sampling factors 2 horiz/2 vert","YCbCr Positioning":"Center of pixel array","tiff:ResolutionUnit":"Inch","uuid":"9576a956-ec32-4314-bc8b-bd5bb43af4f8","Date/Time Original":"2016:09:20 08:53:08","Shutter Speed Value":"1/249 sec","X Resolution":"72 dots per inch","tiff:Make":"PARROT","path":"/","Photometric Interpretation":"YCbCr","Component 3":"Cr component: Quantization table 1, Sampling factors 1 horiz/1 vert","Unique Image ID":"[32 bytes]","F-Number":"F2.3","modified":"2016-09-20T08:53:08","Focal Length 35":"6mm","tiff:BitsPerSample":"8","Exposure Program":"Program action (high-speed program)","GPS Version ID":"2.200","GPS Latitude Ref":"N","meta:creation-date":"2016-09-20T08:53:08","exif:FNumber":"2.2999999166745724","GPS Altitude Ref":"Sea level","Exposure Time":"8597231/2147483647 sec","GPS Longitude":"-73° 4' 50.41\"","Creation-Date":"2016-09-20T08:53:08","ISO Speed Ratings":"426","Make":"PARROT","Orientation":"Top, left side (Horizontal / normal)","Metering Mode":"(Other)","tiff:Orientation":"1","GPS Longitude Ref":"W","tiff:Software":"Dragon 3.9.0","exif:FocalLength":"1.8300001180412324","filename":"Bebop2_20160920085308-0400.jpg","XMP Value Count":"9","geo:long":"-73.080669","file.owner":"root","Software":"Dragon 3.9.0","Exif Image Height":"1088 pixels","tiff:YResolution":"72.0","Y Resolution":"72 dots per inch","GPS Latitude":"40° 45' 16.51\"","dc:description":"{ \"product_id\": \"090C\", \"uuid\": \"CE112B4276E13339AFBAE10E9ED794E3\", \"run_date\": \"2016-09-20T083537-0400\", \"filename\": \"Bebop_2_2016-09-20T085308-0400_CE112B.jpg\", \"media_date\": \"2016-09-20T085308-0400\" }","geo:lat":"40.754585","FlashPix Version":"1.00","Data Precision":"8 bits","White Balance":"Flash","tiff:ImageLength":"1088","description":"{ \"product_id\": \"090C\", \"uuid\": \"CE112B4276E13339AFBAE10E9ED794E3\", \"run_date\": \"2016-09-20T083537-0400\", \"filename\": \"Bebop_2_2016-09-20T085308-0400_CE112B.jpg\", \"media_date\": \"2016-09-20T085308-0400\" }","dcterms:created":"2016-09-20T08:53:08","dcterms:modified":"2016-09-20T08:53:08","Last-Modified":"2016-09-20T08:53:08","file.permissions":"rwxrwxrwx","exif:ExposureTime":"0.00400339765660623","Last-Save-Date":"2016-09-20T08:53:08","GPS Altitude":"21 metres","absolute.path":"/opt/demo/dronedata/","Color Space":"Undefined","File Size":"853159 bytes","meta:save-date":"2016-09-20T08:53:08","file.creationTime":"2016-09-20T12:53:10+0000","Date/Time Digitized":"2016:09:20 08:53:08","File Name":"apache-tika-941370357006559178.tmp","Content-Type":"image/jpeg","Aperture Value":"F2.3","X-Parsed-By":"org.apache.tika.parser.DefaultParser, org.apache.tika.parser.jpeg.JpegParser","File Modified Date":"Tue Sep 20 23:33:24 UTC 2016","tiff:XResolution":"72.0","file.lastModifiedTime":"2016-09-20T12:53:10+0000","exif:DateTimeOriginal":"2016-09-20T08:53:08","Date/Time":"2016:09:20 08:53:08","Exif Image Width":"1920 pixels","Image Height":"1088 pixels","Image Width":"1920 pixels","Unknown tag (0xc62f)":"[19 bytes]","Resolution Unit":"Inch","tiff:Model":"Bebop 2","exif:IsoSpeedRatings":"426","Max Aperture Value":"F2.3","Exposure Mode":"Auto exposure","Model":"Bebop 2","file.lastAccessTime":"2016-09-20T23:33:24+0000","tiff:ImageWidth":"1920","White Balance Mode":"Auto white balance"}

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Local TensorFlow via Python or C++ Binary

python **classify_image.py** --image_file /opt/demo/dronedataold/Bebop2_20160920083655-0400.jpg
solar dish, solar collector, solar furnace (score = 0.98316)
window screen (score = 0.00196)
manhole cover (score = 0.00070)
radiator (score = 0.00041)
doormat, welcome mat (score = 0.00041)

bazel-bin/tensorflow/examples/label_image/label_image --
image=/opt/demo/dronedataold/Bebop2_20160920083655-0400.jpg
tensorflow/examples/label_image/main.cc:204] **solar dish** (577): 0.983162I
tensorflow/examples/label_image/main.cc:204] window screen (912): 0.00196204I
tensorflow/examples/label_image/main.cc:204] manhole cover (763): 0.000704005I
tensorflow/examples/label_image/main.cc:204] radiator (571): 0.000408321I
tensorflow/examples/label_image/main.cc:204] doormat (972): 0.000406186

Labels | Text | Colors | Safe Search | JSON Response

Bebop2_20160920085308-0400.jpg

Roof	85%
Road Surface	81%
Floor	72%
Flooring	69%
Daylighting	66%
Outdoor Structure	61%
Asphalt	61%

Google Vision

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Labels | Text | Colors | Safe Search | JSON Response

Bebop2_20160920085308-0400.jpg

Google Vision

HORTONWORKS

Labels | Text | Colors | Safe Search | JSON Response

Bebop2_20160920085308-0400.jpg


```
            "blue": 56
          },
          "score": 0.021845818,
          "pixelFraction": 0.04462745,
          "percent": 2.2286278299014475,
          "percentRounded": 2,
          "rgb": "55, 51, 56",
          "hex": "373338"
        },
        {
          "color": {
            "red": 25,
            "green": 24,
            "blue": 28
          },
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          "percent": 1.501842633333489,
          "percentRounded": 2,
          "rgb": "25, 24, 28",
          "hex": "19181C"
        }
      ]
    }
  }
}
```


Google Vision

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IBM

Watson sees...

JSON

Classes	Score
grave	0.75 (0 – 1)
cemetery	0.57 (0 – 1)

Type Hierarchy

/places/grave

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Microsoft Computer Vision API

Description	{ "type": 0, "captions": [{ "text": "a wooden table", "confidence": 0.6080851618735831 }] }
Tags	[{ "name": "outdoor", "confidence": 0.9303377270698547 }, { "name": "roof", "confidence": 0.6157336235046387 }, { "name": "paving", "confidence": 0.06508143991231918 }]
Image Format	jpeg
Image Dimensions	1920 x 1088
Clip Art Type	0 Non-clipart
Line Drawing Type	0 Non-LineDrawing
Black & White Image	False
Is Adult Content	False
Adult Score	0.010666818358004093
Is Racy Content	False
Racy Score	0.011605490930378437

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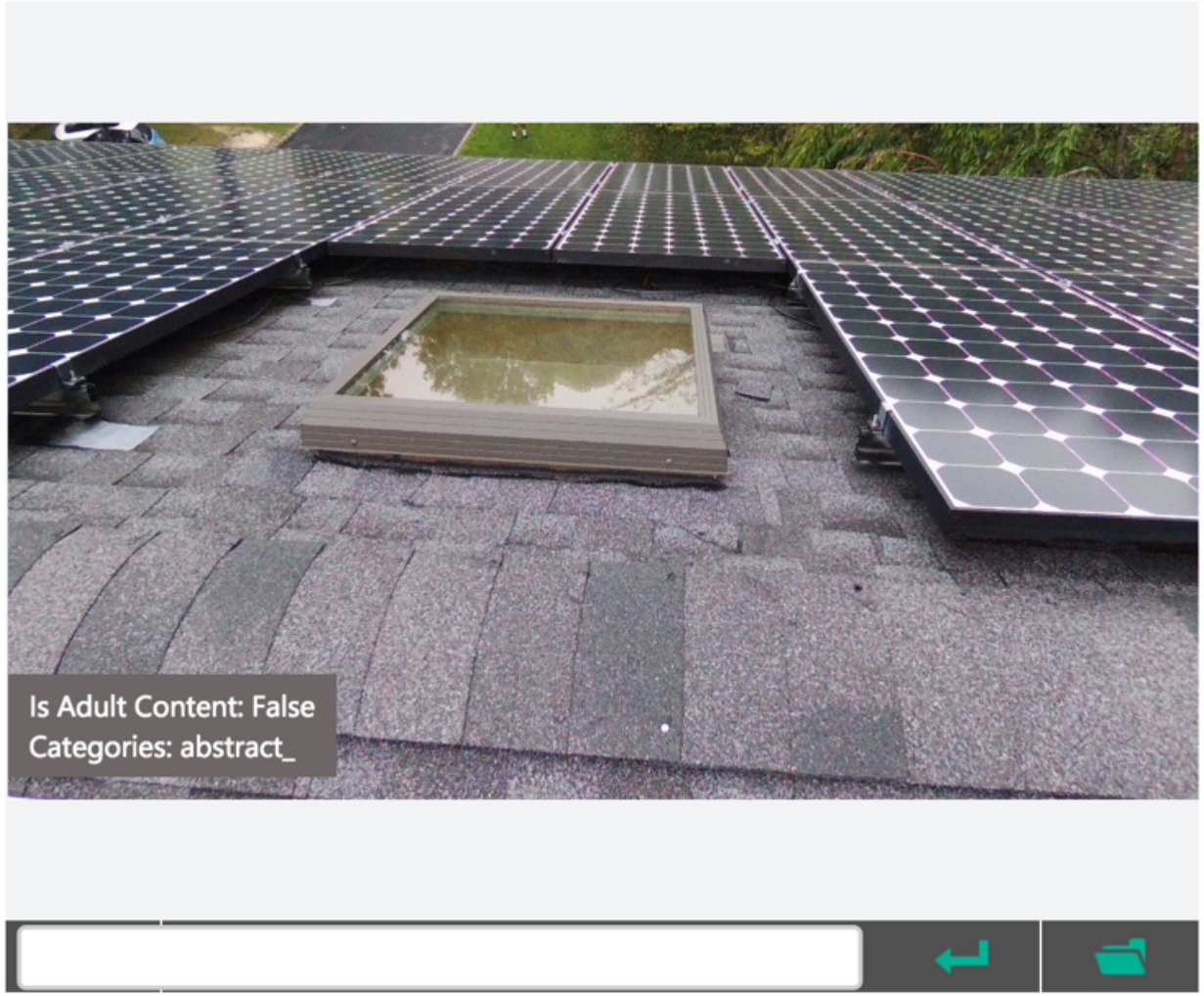
Microsoft Computer Vision API



Adult Score	0.010666818358004093
Is Racy Content	False
Racy Score	0.011605490930378437
Categories	[{ "name": "abstract_", "score": 0.00390625 }, { "name": "abstract_net", "score": 0.2109375 }, { "name": "others_", "score": 0.00390625 }, { "name": "outdoor_", "score": 0.00390625 }]
Faces	[]
Dominant Color Background	
Dominant Color Foreground	
Dominant Colors	
Accent Color	#6B693D

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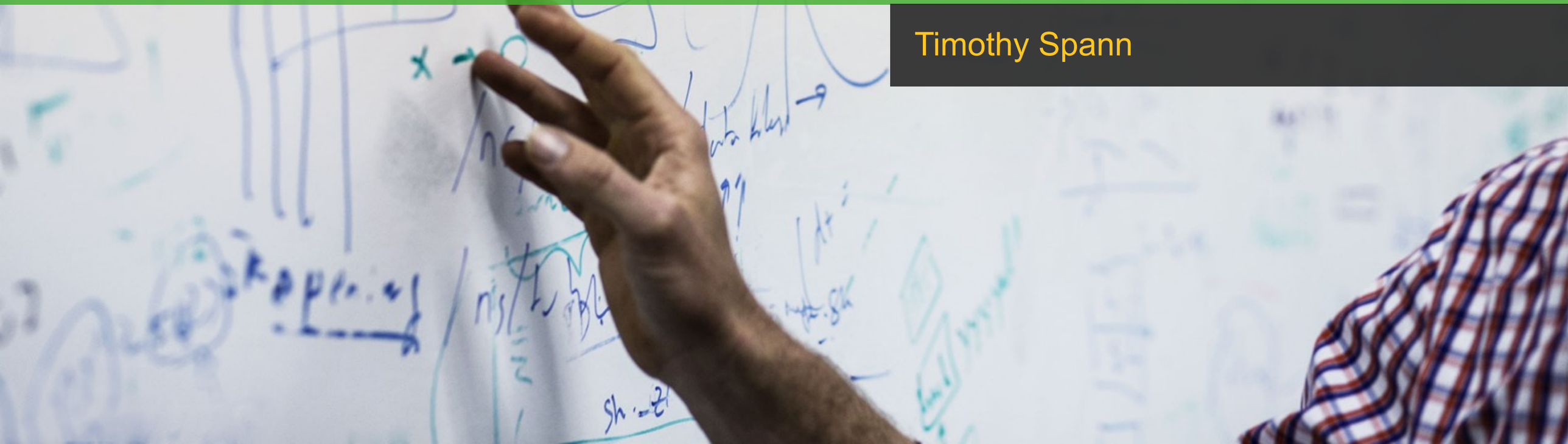
NIFI



Timothy Spann

Installation

Download the binary from here:
http://hortonworks.com/downloads/#dataflow
Or here:
https://nifi.apache.org/download.html
Or on Mac:
brew install nifi

https://nifi.apache.org/docs/nifi-docs/html/getting-started.html#starting-nifi

bin/nifi.sh start

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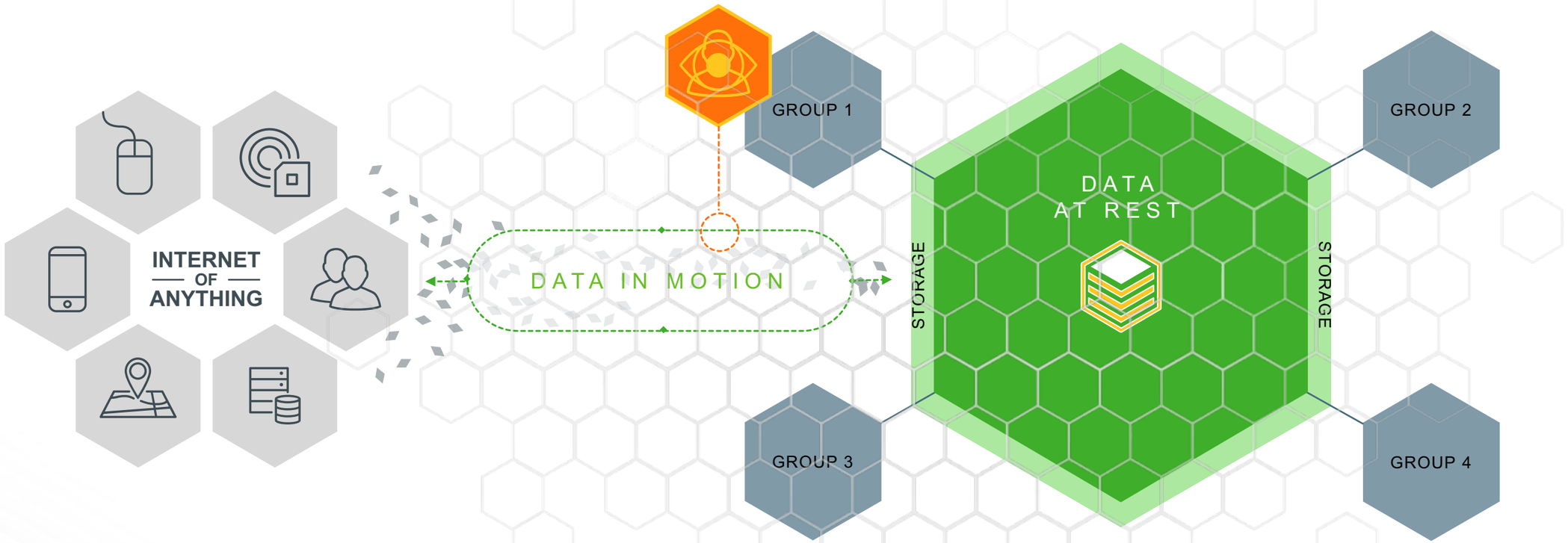
The Future of Data: Actionable Intelligence



Hortonworks' unique approach to data-in-motion and data-at-rest powers Actionable Intelligence

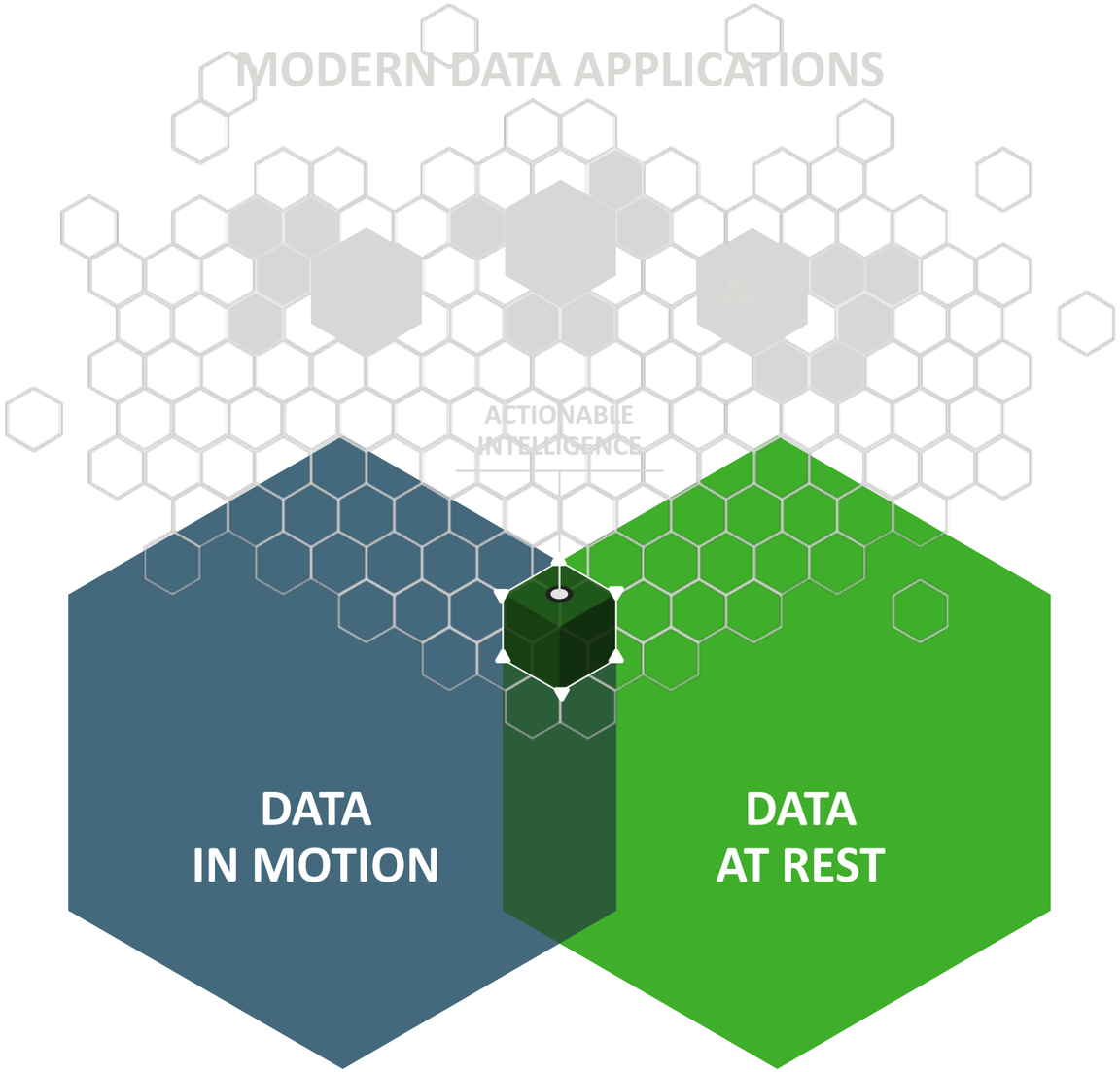
HORTONWORKS

Actionable Intelligence from Connected Data Platforms

Capturing perishable insights from data in motion

Ensuring rich, historical insights on data at rest

Necessary for modern data applications



Hortonworks DataFlow

Hortonworks Data Platform

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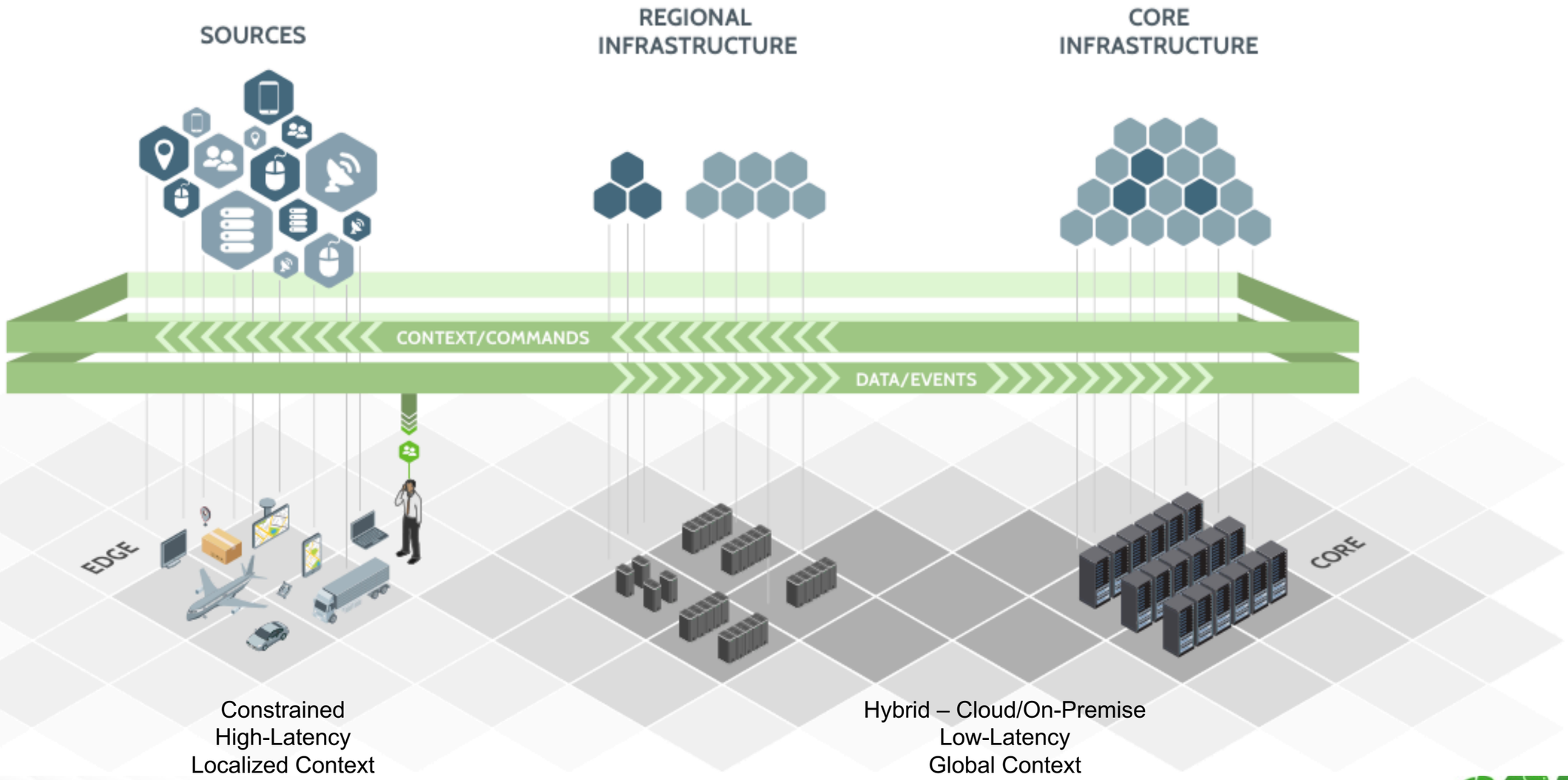
HDF Provides “Data Plan of Control” by Managing IoT Dataflows

Data source agnostic collection of data across heterogeneous environments

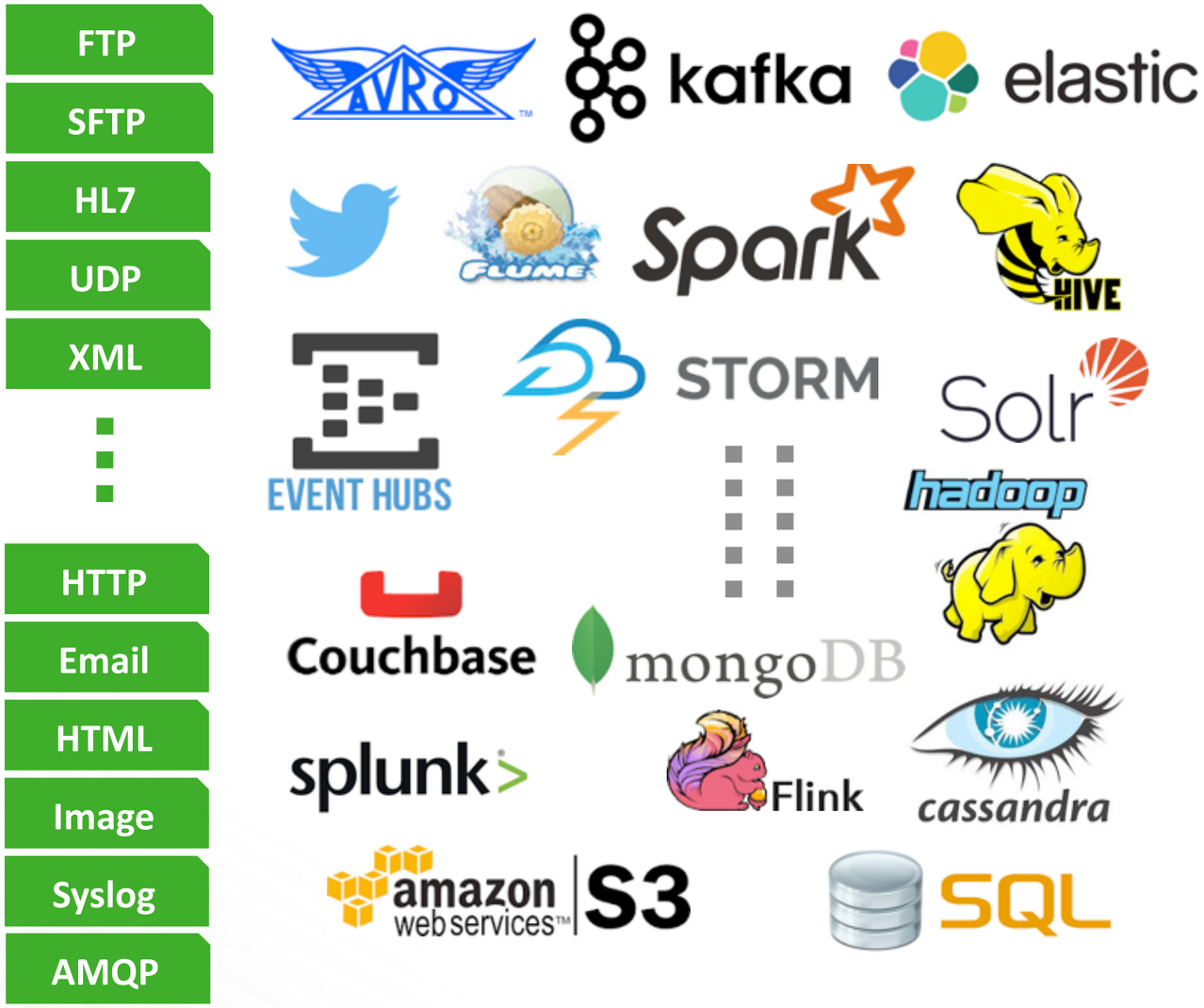


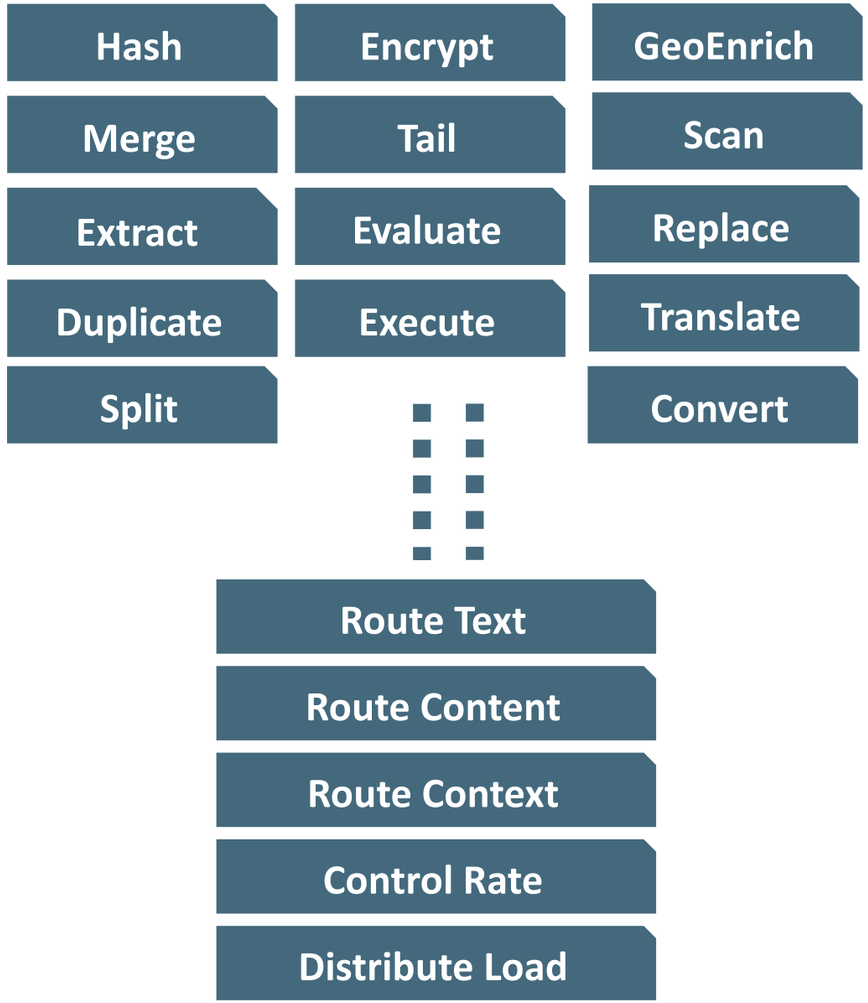
Constrained
High-Latency
Localized Context

Hybrid – Cloud/On-Premise
Low-Latency
Global Context

HORTONWORKS

Rapid Ecosystem Adoption: 170+ Processors





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Data-in-motion: Hortonworks DataFlow Powered by Apache NiFi

Hortonworks DataFlow

Data-in-motion

Collect, conduct and curate real-time data

End-to-end security with encryption and rules

Traceability and real-time provenance

Delivers Instant, Perishable Insights

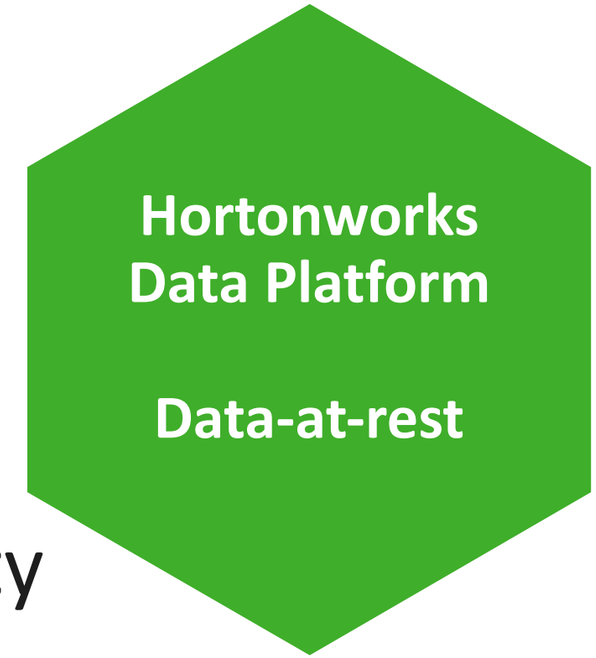
HORTONWORKS

Data-at-rest: Hortonworks Data Platform Powered by Apache Hadoop

Accumulate, Analyze, Act on All Data

Centralized Architecture for Multi-tenancy

Enterprise Operations, Governance and Security



Delivers Rich Historical Insights

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Learning More

- https://hortonworks.com/hadoop-tutorial/learning-ropes-apache-nifi/
- https://github.com/jfrazee/awesome-nifi
- https://dzone.com/articles/getting-started-with-apache-nifi-and-hdf
- https://nifi.apache.org/docs.html
- https://community.hortonworks.com/articles/4356/getting-started-with-nifi-expression-language-and.html

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Contact:

Timothy Spann @PaaSDeV

www.meetup.com/futureofdata-princeton

community.hortonworks.com/users/9304/tspann.html

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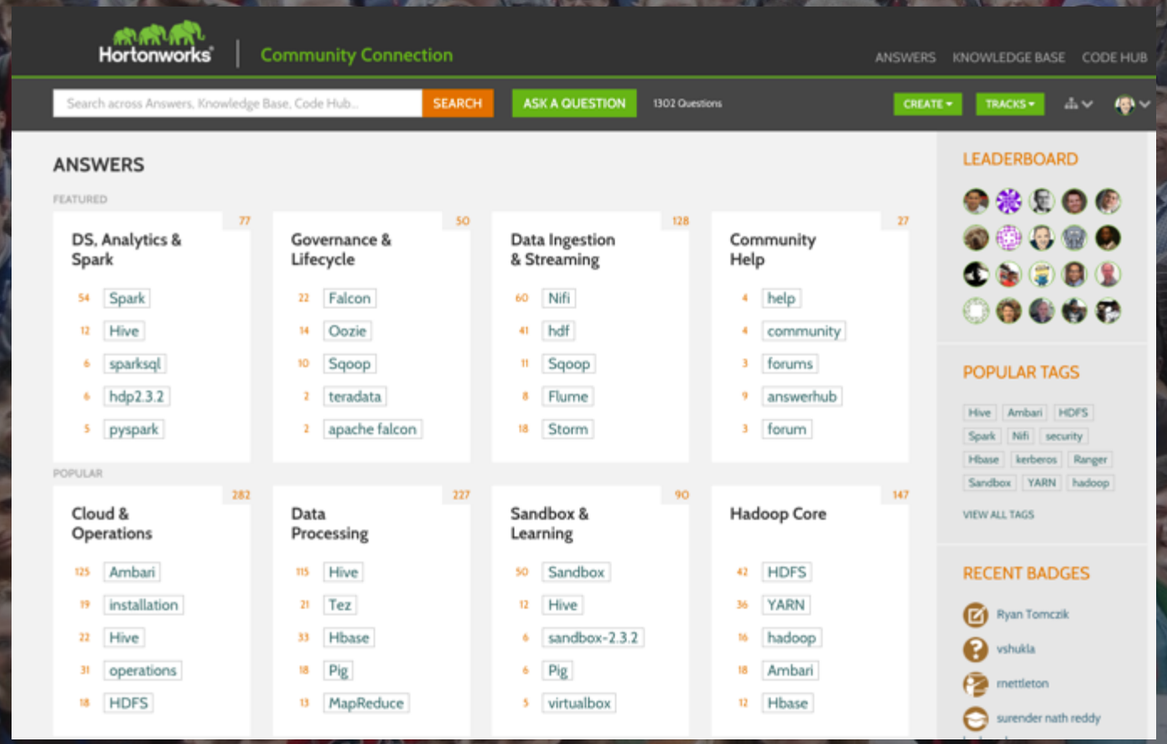
Hortonworks Community Connection



- Full Q&A Platform (like StackOverflow)
- Knowledge Base Articles
- Code Samples and Repositories

Read access for everyone, join to participate and be recognized

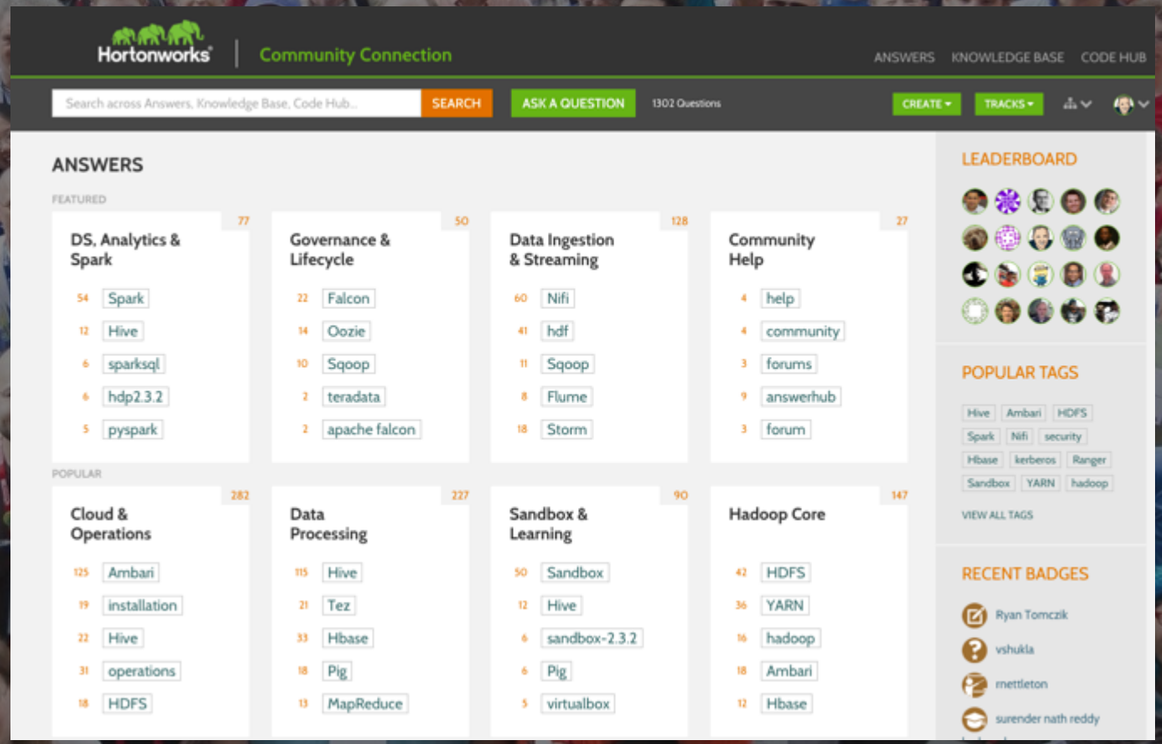
Community Engagement

4,000+
Registered Users

10,000+
Answers

15,000+
Technical Assets

One Website!



Participate now at: community.hortonworks.com